

REMARKS

Claims 1-3 and 5-10 are pending herein.

I. Claim 1 has been respectfully amended to included the limitations from claim 4 which is canceled.

No new search is required by this amendment, as this amendment is allowable in a response to final rejection in accordance with 37 CFR 1.116.

II. The obviousness rejection of independent claim 1 based on Young (US 6,561,640).

The USPTO respectfully rejects claim 1 under 35 U.S.C. § 103(a) as being obvious over Young.

A. The cited reference does not teach or suggest an ultraviolet ray irradiating apparatus in which at least one ultraviolet ray source emitting at a shorter peak wavelength is arranged at a position adjacent to and closer to the recording head than that of the other ultraviolet ray source, as claimed in claim 1.

Regarding the limitations of claim 1 that claim in relevant part:

“the ultraviolet ray irradiating apparatus comprises . . .

at least one ultraviolet ray source of the ultraviolet ray having a shorter wavelength component at the light emitting wavelength peak is arranged at a position adjacent to and closer to the recording head than that of the other ultraviolet ray source.” (emphasis added)

it is respectfully not seen where the cited reference teaches or suggests the claimed structure quoted above.

Specifically, present Figure 6 illustrates one embodiment of the structure claimed above. As seen in Figure 6, ultraviolet irradiating device 9 is adjacent to recording heads 6. Within ultraviolet irradiating device 9, Figure 6 shows shorter peak wavelength ultraviolet ray sources 15a and longer peak wavelength ultraviolet ray sources 15b. As best seen in Figure 6, at least one of the shorter peak wavelength ultraviolet ray sources 15a is arranged at a position adjacent to and closer to the recording heads 6 than that of the other ultraviolet ray sources 15b, as claimed in claim 1.

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The claimed structure quoted above is important because it helps to further prevent blurring and color-mixing between inks used on a recording medium while producing a better quality image. To prevent blurring and color-mixing, at least the surface of the ink volume on the recording medium must be cured. However, if the entire volume of the ink is cured at once, this could result in shrinkage and wrinkling of the ink. Therefore, it is desirable to initially cure only the surface of the ink.

As described on page 25 of the present specification, the pigment in the ink absorbs and scatters short wavelength ultraviolet rays to some degree. Therefore, short-wavelength ultraviolet rays do not penetrate very deeply into a volume of ink on the recording medium, leaving the interior of the ink volume uncured. The interior of the ink volume becomes cured when exposed to longer wavelength ultraviolet rays that penetrate deeper into the ink droplet.

Thus, it is desirable to first cure the ink with short wavelength ultraviolet waves in order to prevent blurring and color-mixing without shrinking or wrinkling the ink. The claimed structure (quoted above) accomplishes this goal by arranging at least one short peak wavelength ultraviolet ray source adjacent to and closer to the recording head than that of the other ultraviolet ray source (please see pages 26-27 of the present specification for further explanation).

In contrast, applicant respectfully asserts that cited reference Young does not teach or suggest that at least one short peak wavelength ultraviolet ray source is located adjacent to and closer to the recording head than that of the other ultraviolet ray source, as claimed in claim 1.

As the USPTO notes in the Office Action on page 2, Young Figure 2 teaches an ultraviolet irradiating device (reference numerals 140 and 150). However, Young does not teach that the irradiating device 140 closer to recording head 120 emits ultraviolet rays at a shorter peak wavelength than the other irradiating device 150, as claimed in claim 1.

In fact, the Young specification appears to teach that the irradiating device closest to the recording head actually emits ultraviolet rays at a larger peak wavelength than the other irradiation device. Column 6, lines 46-53, of Young states "the ultraviolet resin that reacts to the least energetic wavelengths of light will be processed first. . . . [T]he ultraviolet resin that reacts to the most energetic wavelength of light . . . is processed last." Because the energy of ultraviolet rays is inversely proportional to their wavelength, Young

appears to teach that the ink should be irradiated with large wavelength rays first, and short wavelength rays last. This teaching of Young is opposite and different from the claimed structure quoted above that results in the ink being irradiated by short wavelength rays first, as explained on pages 26-27 of the present specification. This is a critical difference.

Thus, because Young is inconsistent with the structure claimed in claim 1, it is respectfully asserted that Young cannot teach or suggest that a short peak wavelength ultraviolet ray source is arranged at a position adjacent to and closer to the recording head than that of the other ultraviolet ray source, and *thus Young "teaches away" from the claimed structure.* See MPEP 2144.05: "A *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997)

In re Aller

Also, in response to USPTO assertion that it would be obvious to merely optimize ranges, applicants have already respectfully pointed out in the previous response that no specific ranges are claimed, so this argument does not apply.

Applicants respectfully assume that this USPTO argument is in reference to the *In re Aller* case as described at MPEP 2144.05 Obviousness of Ranges quoted below where *specific ranges* are discussed:

"II. OPTIMIZATION OF RANGES

A. Optimization Within Prior Art Conditions or Through Routine Experimentation
Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a

temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be *prima facie* obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%.); see also *Peterson*, 315 F.3d at 1330, 65 USPQ2d at 1382 ("The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) (Claimed elastomeric polyurethanes which fell within the broad scope of the references were held to be unpatentable thereover because, among other reasons, there was no evidence of the criticality of the claimed ranges of molecular weight or molar proportions.). For more recent cases applying this principle, see *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), *cert. denied*, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997)."

Thus, it is respectfully asserted that the cited reference Young does not teach or suggest the claimed structures quoted above. Therefore, it is respectfully asserted that claim 1 is not obvious over Young.

III. The dependent claims.

As noted above, it is respectfully asserted that independent claim 1 is allowable. Therefore, it is further respectfully asserted that dependent claims 2-3 and 5-10 are also allowable and the cited references do not make up for the deficiencies in the primary reference, Young.


IV. Conclusion.

Reconsideration and allowance of all of the claims is respectfully requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130. Please contact the undersigned for any reason. Applicants seek to cooperate with the Examiner including via telephone if convenient for the Examiner.

Respectfully submitted,

CANTOR COLBURN LLP

By 
Daniel P. Lent
Registration No. 44,867

Date: July 12, 2006
CANTOR COLBURN LLP
55 Griffin Road South
Bloomfield, CT 06002
Telephone (860) 286-2929
Facsimile (860) 286-0115
Customer No.: 23413

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